

Dr. Manoj Kumar Jha

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EDUCATION

- **University of Delhi**, Department of Physics & Astrophysics, Delhi, India,
Ph.D. in Experimental Particle Physics, March 2007
Thesis: Tests of QCD in p-p Interactions at 14 TeV.
Advisor: Professor Ram K. Shivpuri
- **University of Delhi**, Department of Physics & Astrophysics, Delhi, India.
Master of Science (Physics): 1998-2000, First Division.
- **University of Delhi**, Delhi, India, **Bachelor of Science, Physics (Hons):**
1995-98, First Division.

HONOURS, AWARDS, FELLOWSHIP

- **INFN Post Doctoral Fellow** at Bologna “in the CDF experiment at Fermilab” from September 2007 - present.
- **Visiting Scientist** at “Fermilab, Batavia, USA” to collaborate on the CMS physics and simulation from October 2006 - June 2007.
- **Scientist** at “Center for Detector & Related Software Technology (CDRST), Department of Physics, University of Delhi”, on the project “Search for new particles at Large Hadron Collider at CERN, GENEVA”, June 2005 - June 2007.
- **Senior Research Fellow**, Council of Scientific and Industrial Research (CSIR), Govt. of India, July 2002 - May 2005.
- **Junior Research Fellow**, CSIR, Govt. of India, July 2000 - June 2002.
- Awarded University Grant Commission, **National Scholarship at the Centre of Advance Studies**, Department of Physics & Astrophysics, University of Delhi, 1998 - 2000.

RESEARCH FIELDS

Grid Computing and Experimental High Energy Physics.

RESEARCH EXPERIENCE

Grid Computing

I am working for the CDF experiment in the offline computing group. Since CDF has recently changed and improved its computing model, decentralizing some parts of it in order to be able to exploit the rising number of distributed resources available nowadays. Despite those efforts, while the large majority of CDF Monte Carlo production has moved to the Grid, data processing is still mainly performed in dedicated farms hosted at FNAL, requiring a centralized management of data and Monte Carlo samples needed for physics analysis. This rises the question on how to manage the transfer of produced Monte Carlo samples from remote Grid sites to FNAL in an efficient way; up to now CDF has relied on a non scalable centralized solution based on dedicated data servers accessed through rcp protocol, which has proven to be unsatisfactory.

I proposed a new data transfer model that uses SRMs as local caches for remote Monte Carlo production sites, interfaces them with SAM, the experiment data catalog, and finally realizes the file movement exploiting the features provided by the catalog data transfer layer. **Presented in CHEP, 21 – 27th March, 2009, Prague.**

I graduated on CMS in 2007. I conducted the Simulation Workshop for CMS 16th-24th Feb., 2004, held at the Center for Detector and Related Software Technology, University of Delhi, India. The participants included post-doctoral fellows, graduate students, system managers and software experts from Tata Institute of Fundamental Research (TIFR) Mumbai, Panjab University & Delhi University. The participants learnt the installation of CMS software and their use in physics analysis. I was the system administrator of Delhi group during my graduation days.

I was the member of **LHC Physics Center(LPC)** monte carlo production group at Fermilab when CMS was taking transition from CMS Object Oriented (CMSOO) to CMSSW. It was my responsibility to avail the fully simulated MC samples to the LPC members on time. The MC sample were used for validation of the new releases of CMSSW. I also had the experience of using CMSSW and LPC condor farm for my physics analysis related work.

Physics Analysis

In CMS, I worked on performance of jet algorithms in comparison to Seedless Infrared-Safe Cone (SISCone). We proposed that SISCone be adopted as the default cone based jet clustering algorithm for CMS (**Published in CMS AN 2008/02**). Under

search for new phenomena, I studied CMS sensitivity to quark contact interactions in the dijet final state using the new CMS software framework for simulation and reconstruction (CMSSW). My analysis demonstrates that the present Tevatron limit on quark compositeness will be crossed only with 10 pb^{-1} of data (**Published in J. Phys. G36:015004,2009**).

After my graduation, I got an opportunity to work on real data for CDF experiment. I am using the ratio of x-section of dijets to search for quark compositeness at Tevatron energy(**Abstract accepted to APS April 2009, Denver, USA**). Our group has considerable experience in extracting physics from minimum bias data. I am also evaluating the contribution of heavy flavor hadrons especially from bottom and charm quarks in the minimum bias data. The present HF tagger algorithm is not suited for minimum bias data due to presence of very low P_T particles. I re-wrote the HF tagger algorithm for our case and found that the results are encouraging. This analysis is under progress now.

CONFERENCE/WORKSHOP/SCHOOL ATTENDED

1. **INFN Grid Computing School**, held at INFN Bologna, Italy from 6th to 9th Oct. 2008.
2. **CTEQ Summer School on QCD Analysis and Phenomenology**, held at University of Wisconsin, Madison from 30th May - 7th June, 2007.
3. **Workshop on Computing in High Energy Physics (CHEP)**, held at Tata Institute of Fundamental Research, Mumbai from 13th - 17th Feb., 2006.
4. **Simulation Workshop for CMS**, 18th – 20th Feb. - 2002, held at Ooty, India.
5. **Workshop on CMS at LHC** held at Tata Institute of Fundamental Research (TIFR), Mumbai (Dec. 2000).

REFERENCES

- Dr. Franco Rimondi
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LIST OF PUBLICATIONS

Following are the list of publications in which I personally contributed.

Work under progress

CDF Experiment

1. “The dijet mass spectrum and a search for quark compositeness at CDF.” Abstract accepted to APS Denver, Colorado, April 09.
2. “A new CDF model for data movement based on SRM.” Abstract accepted to Presented in CHEP 21 – 27th March 2009, Prague, Czech Republic.

Work completed

CMS Analysis Notes and Publications

1. “CMS search plans and sensitivity to new physics with dijets”, A. Bhatti, ..., Manoj K. Jha, et al, Published in: **J. Phys. G36:015004,2009.**
2. “Performance of the SIScone Jet Clustering Algorithm”, A. Bhatti, ..., Manoj K. Jha, et al, CMS Document No.: **CMS AN - 2008/002.**
3. “Jet and MET Performance in CMSSW_1_2_0”, M.A. Acosta, ..., Manoj K. Jha, et. al, CMS Document No.: **CMS IN - 2007/053.**
4. “CMS Search Plans and Sensitivity to New Physics using Dijets”, M. Cardaci, ..., Manoj K. Jha, et al, CMS Document No.: **CMS AN - 2007/039.**
5. “Dijet Ratio from QCD and Contact Interactions”, Manoj K. Jha, R.M. Harris, and M. Zielinski, CMS Document No.: **CMS AN - 2007/015.**

Direct Photon Physics

1. “Study of direct photon production at the CERN LHC”, A. Kumar, M. K. Jha, B. M. Sodermark, A. Bhardwaj, K. Ranjan and R. K. Shivpuri, **Physical Review D 67, 014016 (2003).**
2. “Study of parton k_T smearing effects in direct photon production at the Fermilab, Tevatron”, A. Kumar, K. Ranjan, M. K. Jha, A. Bhardwaj, B. M. Sodermark and R. K. Shivpuri, **Physical Review D 68, 014017 (July 2003).**

Silicon Sensors Development for CMS Preshower

1. **“High-voltage planar Si detectors for high-energy physics experiments: comparison between metal-overhang and field-limiting ring techniques”**, K. Ranjan, A. Bhardwaj, Namrata, S. Chatterji, A. K. Srivastava, Ashish Kumar, **Manoj Kumar Jha** and R. K. Shivpuri, **Solid State Electronics** **48**, 1587 (2004).
2. **“Simulation Study of irradiated Si sensors equipped with metal-overhang for applications in LHC environment”**, S. Chatterji, ..., **M.K. Jha**, et. al, **IEEE Trans. Nucl. Science** **51** (2), 298(2004).
3. **“Breakdown voltage analysis of neutron irradiated silicon detectors”**, A. Bhardwaj, K. Ranjan, Namrata, S. Chatterji, A. K. Srivastava, A. Kumar, **M. K. Jha**, and R. K. Shivpuri, **Eur. Phys. J. AP.** **24**, 171(2003).

CDF collaboration

1. **“Top Quark Mass Measurement in the Lepton plus Jets Channel Using a Modified Matrix Element Method”**
T. Aaltonen, ..., **M.K. Jha**, *et al.* [CDF Collaboration]
arXiv:0812.4469 [hep-ex]
FERMILAB-PUB-08-574-E(2008)
2. **“Observation of New Charmless Decays of Bottom Hadrons”**
T. Aaltonen, ..., **M.K. Jha**, *et al.* [CDF Collaboration]
arXiv:0812.4271 [hep-ex]
FERMILAB-PUB-08-573-E(2008) (Submitted to Phys.Rev.Lett.)
3. **“Search for new particles decaying into dijets in proton-antiproton collisions at $\sqrt{s} = 1.96$ TeV”**
T. Aaltonen, ..., **M.K. Jha**, *et al.* [The CDF Collaboration]
arXiv:0812.4036 [hep-ex]
FERMILAB-PUB-08-572-E(2008) (Submitted to Phys.Rev.D)
4. **“Search for top-quark production via flavor-changing neutral currents in $W+1$ jet events at CDF”**
T. Aaltonen, ..., **M.K. Jha**, *et al.* [CDF Collaboration]
arXiv:0812.3400 [hep-ex]
5. **“Measurement of the kT Distribution of Particles in Jets Produced in $p\bar{p}$ Collisions at $\sqrt{s}=1.96$ TeV”**
T. Aaltonen, ..., **M.K. Jha**, *et al.* [CDF Collaboration]
arXiv:0811.2820 [hep-ex]
FERMILAB-PUB-08-525-E(2008) (Submitted to Phys.Rev.Lett.)

6. **“Inclusive Search for Squark and Gluino Production in $p\bar{p}$ Collisions at $\sqrt{s} = 1.96$ TeV”**
T. Aaltonen, ..., **M.K. Jha**, *et al.* [CDF Collaboration]
arXiv:0811.2512 [hep-ex]
FERMILAB-PUB-08-526-E(2008) (Submitted to Phys.Rev.Lett.)
7. **“Top Quark Mass Measurement in the $t\bar{t}$ -bar All Hadronic Channel using a Matrix Element Technique in $p\bar{p}$ Collisions at $\sqrt{s} = 1.96$ TeV”**
T. Aaltonen, ..., **M.K. Jha**, *et al.* [CDF Collaboration]
arXiv:0811.1062 [hep-ex]
FERMILAB-PUB-08-517-E(2008)
8. **“Measurement of W-Boson Helicity Fractions in Top-Quark Decays Using $\cos\theta^*$ ”**
T. Aaltonen, ..., **M.K. Jha**, *et al.* [The CDF Collaboration]
arXiv:0811.0344 [hep-ex]
FERMILAB-PUB-08-511-E(2008) (Submitted to Phys.Lett.B)
9. **“A search for high-mass resonances decaying to dimuons at CDF”**
T. Aaltonen, ..., **M.K. Jha**, *et al.* [The CDF Collaboration]
arXiv:0811.0053 [hep-ex]
FERMILAB-PUB-08-512-E(2008) (Submitted to Phys.Rev.Lett.)
10. **“Study of multi-muon events produced in $p\bar{p}$ collisions at $\sqrt{s}=1.96$ TeV”**
T. Aaltonen, ..., **M.K. Jha**, *et al.* [CDF Collaboration]
arXiv:0810.5357 [hep-ex]
FERMILAB-PUB-08-046-E(2008) (Submitted to Phys.Rev.D)
11. **“Search for new physics in the $\mu+\mu+e/\mu+\text{met}$ channel with a low- p_T lepton threshold at the Collider Detector at Fermilab”**
T. Aaltonen, ..., **M.K. Jha**, *et al.* [CDF Collaboration]
arXiv:0810.3522 [hep-ex]
FERMILAB-PUB-08-516-E(2008) (Submitted to Phys.Rev.D)
12. **“First Measurement of the Ratio of Branching Fractions $B(\Lambda_b^0 \rightarrow \Lambda_c^+ \mu^- \bar{\nu}_\mu)/B(\Lambda_b^0 \rightarrow \Lambda^+ c \pi^-)$ ”**
T. Aaltonen, ..., **M.K. Jha**, *et al.* [CDF Collaboration]
arXiv:0810.3213 [hep-ex]
FERMILAB-PUB-08-446-E(2008) (Submitted to Phys.Rev.D)
13. **“Search for High-Mass e^+e^- Resonances in $p\bar{p}$ Collisions at $\sqrt{s}=1.96$ TeV”**
T. Aaltonen, ..., **M.K. Jha**, *et al.* [CDF Collaboration]

- arXiv:0810.2059 [hep-ex]
FERMILAB-PUB-08-434-E(2008)
14. **“The first measurement of the top quark mass at CDF II in the lepton+jets and dilepton channels simultaneously”**
T. Aaltonen, ..., **M.K. Jha**, *et al.* [CDF Collaboration]
arXiv:0809.4808 [hep-ex]
FERMILAB-PUB-08-415(2008) (Submitted to Phys.Rev.D)
 15. **“Search for a Higgs Boson Decaying to Two W Bosons at CDF”**
T. Aaltonen, ..., **M.K. Jha**, *et al.* [CDF Collaboration]
arXiv:0809.3930 [hep-ex]
FERMILAB-PUB-08-401-E(2008) (Submitted to Phys.Rev.Lett.)
 16. **“Global Search for New Physics with 2.0/fb at CDF”**
T. Aaltonen, ..., **M.K. Jha**, *et al.* [CDF Collaboration]
arXiv:0809.3781 [hep-ex]
FERMILAB-PUB-08-400-E(2008)
 17. **“Measurement of the Single Top Quark Production Cross Section at CDF”**
T. Aaltonen, ..., **M.K. Jha**, *et al.* [CDF Collaboration]
Phys. Rev. Lett. **101**, 252001 (2008) [arXiv:0809.2581 [hep-ex]]
 18. **“First observation of $\bar{B}_s^0 \rightarrow D_s^\pm K^\mp$ and measurement of the ratio of branching fractions $\mathbf{B}(\bar{B}_s^0 \rightarrow D_s^\pm K^\mp) / \mathbf{B}(\bar{B}_s^0 \rightarrow D_s^+ \pi^-)$ ”**
T. Aaltonen, ..., **M.K. Jha**, *et al.* [CDF Collaboration]
arXiv:0809.0080 [hep-ex]
FERMILAB-PUB-08-330-E(2008) (Submitted to Phys,Rev,Lett.)
 19. **“Search for Supersymmetry in $p\bar{p}$ Collisions at $\sqrt{s} = 1.96$ -TeV Using the Trilepton Signature of Chargino-Neutralino Production”**
T. Aaltonen, ..., **M.K. Jha**, *et al.* [CDF Collaboration]
Phys. Rev. Lett. **101**, 251801 (2008) [arXiv:0808.2446 [hep-ex]]
 20. **“First Direct Bound on the Total Width of the Top Quark in $p\bar{p}$ Collisions at $\sqrt{s} = 1.96$ -TeV”**
T. Aaltonen, ..., **M.K. Jha**, *et al.* [CDF Collaboration]
arXiv:0808.2167 [hep-ex]
FERMILAB-PUB-08-302-E(2008) (Submitted to Phys.Rev.Lett.)
 21. **“Measurement of the top quark mass with dilepton events selected using neuroevolution at CDF”**
T. Aaltonen, ..., **M.K. Jha**, *et al.* [CDF Collaboration]

- arXiv:0807.4652 [hep-ex]
FERMILAB-PUB-08-369-E(2008) (Submitted to Phys.Rev.Lett.)
22. **“Search for the Higgs boson produced with $Z \rightarrow \ell^+\ell^-$ in $p\bar{p}$ collisions at $\sqrt{s} = 1.96$ TeV”**
T. Aaltonen, ..., **M.K. Jha**, *et al.* [CDF Collaboration]
Phys. Rev. Lett. **101**, 251803 (2008) [arXiv:0807.4493 [hep-ex]]
 23. **“Measurement of the fraction of $t\bar{t}$ production via gluon-gluon fusion in $p\bar{p}$ collisions at $\sqrt{s} = 1.96$ -TeV”**
T. Aaltonen, ..., **M.K. Jha**, *et al.* [CDF Collaboration]
arXiv:0807.4262 [hep-ex]
FERMILAB-PUB-08-258-E(2008) (Submitted to Phys.Rev.Lett.)
 24. **“Search for large extra dimensions in final states containing one photon or jet and large missing transverse energy produced in $p\bar{p}$ collisions at $\sqrt{s} = 1.96$ -TeV”**
T. Aaltonen, ..., **M.K. Jha**, *et al.* [CDF Collaboration]
Phys. Rev. Lett. **101**, 181602 (2008) [arXiv:0807.3132 [hep-ex]]
 25. **“Measurement of the Inclusive Jet Cross Section at the Fermilab Tevatron p-pbar Collider Using a Cone-Based Jet Algorithm”**
T. Aaltonen, ..., **M.K. Jha**, *et al.* [CDF Collaboration]
Phys. Rev. D **78**, 052006 (2008) [arXiv:0807.2204 [hep-ex]]
 26. **“Forward-Backward Asymmetry in Top Quark Production in $p\bar{p}$ Collisions at $\sqrt{s} = 1.96$ TeV”**
T. Aaltonen, ..., **M.K. Jha**, *et al.* [CDF Collaboration]
Phys. Rev. Lett. **101**, 202001 (2008) [arXiv:0806.2472 [hep-ex]]
 27. **“Measurement of b -jet Shapes in Inclusive Jet Production in $p\bar{p}$ Collisions at $\sqrt{s} = 1.96$ -TeV”**
T. Aaltonen, ..., **M.K. Jha**, *et al.* [CDF Collaboration]
Phys. Rev. D **78**, 072005 (2008) [arXiv:0806.1699 [hep-ex]]
 28. **“Search for the Flavor Changing Neutral Current Decay $t \rightarrow Zq$ in $p\bar{p}$ Collisions at $\sqrt{s} = 1.96$ ”**
T. Aaltonen, ..., **M.K. Jha**, *et al.* [CDF Collaboration]
Phys. Rev. Lett. **101**, 192002 (2008) [arXiv:0805.2109 [hep-ex]]
 29. **“Search for the Rare Decays $B^+ \rightarrow \mu^+\mu^-K^+$, $B^0 \rightarrow \mu^+\mu^-K^{*0}(892)$, and $B_s^0 \rightarrow \mu^+\mu^-\phi$ at CDF”**
T. Aaltonen, ..., **M.K. Jha**, *et al.* [CDF Collaboration]
arXiv:0804.3908 [hep-ex]
FERMILAB-PUB-08-094-E(2008)

CMS Collaboration

1. “**The CMS experiment at the CERN LHC**”
R. Adolphi , ..., **M. Jha**, *et al.* [CMS Collaboration]
JINST **3**, S08004 (2008)
2. “**CMS physics technical design report: Addendum on high density QCD with heavy ions**”
D. G. . d’Enterria , ..., **M. Jha**, *et al.* [CMS Collaboration]
J. Phys. G **34**, 2307 (2007)
3. “**Energy resolution of the barrel of the CMS electromagnetic calorimeter**”
P. Adzic , ..., **M. Jha**, *et al.*
JINST **2**, P04004 (2007)
4. “**CMS technical design report, volume II: Physics performance**”
G. L. Bayatian , ..., **M. Jha**, *et al.* [CMS Collaboration]
J. Phys. G **34**, 995 (2007)

Conference Notes

1. “Projection of the annealing behaviour of irradiated Si sensors in the LHC environment”, S. Chatterji, Kirti Ranjan, Ashutosh Bhardwaj, Namrata, Ajay K. Srivastava, Ashish Kumar, **Manoj Kumar Jha**, Brajesh C. Choudhary, Pooja Gupta, Sushil Singh Chauhan and R.K. Shivpuri, presented in 2004 **IEEE Nuclear Science Symposium and Medical Imaging Conference** held in Rome, Italy.
2. “Impact of Metal Overhang and Guard Ring techniques on Breakdown voltage of Si strip sensors”, S. Chatterji, Kirti Ranjan, Ashutosh Bhardwaj, Namrata, Ajay K. Srivastava, Ashish Kumar, **Manoj Kumar Jha**, and R.K. Shivpuri, presented in 2003 **IEEE Nuclear Science Symposium and Medical Imaging Conference** held in USA.
3. “Impact of harsh radiation on metal-overhang equipped sensors in the LHC environment”, S. Chatterji, Kirti Ranjan, Ashutosh Bhardwaj, Namrata, Ajay K. Srivastava, Ashish Kumar, **Manoj Kumar Jha**, and R.K. Shivpuri, presented in 2003 **IEEE Nuclear Science Symposium and Medical Imaging Conference** held in USA.
4. “Impact of Field Limiting Ring technique on Breakdown voltage of irradiated Si sensors”, Ashutosh Bhardwaj, Kirti Ranjan, Namrata, S. Chatterji, Ajay

K. Srivastava, Ashish Kumar, **Manoj Kumar Jha**, and R.K. Shivpuri, presented in 2003 **IEEE Nuclear Science Symposium and Medical Imaging Conference** held in USA.

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